

Patent claims

1. A process for production of long-fiber-reinforced molding compositions encompassing the steps of:
 - 5 a) passing, over a surface, at least one multifilament strand of multifilaments subject to tension, so that in the at least one strand the multifilaments spread apart and form an opened multifilament strand,
 - b) introducing the opened multifilament strand subject to tension into a first impregnator,
 - 10 c) conducting a first thermoplastic molding composition into the first impregnator, where the first thermoplastic molding composition comprises at least one thermoplastic polymer, at least one catalyst which catalyzes the formation of covalent bonds between the thermoplastic polymer and the surface of the multifilaments, and, where appropriate, comprises other additives which do not adversely affect the activity of the catalyst,
 - 15 d) impregnating the at least one opened multifilament strand with the plastified first thermoplastic molding composition,
 - e) drawing-off of the fiber-reinforced strand formed from the first impregnator,
 - f) passing the fiber-reinforced strand into a second die,
 - 20 g) conducting a second thermoplastic molding composition, other than the first thermoplastic molding composition and comprising at least one thermoplastic polymer and comprising additives, into the second die,
 - 25 h) sheathing the fiber-reinforced strand with the plastified second thermoplastic molding composition in the second die,
 - i) drawing-off of the fiber-reinforced strand provided with a sheath composed of the second thermoplastic molding composition from the second die, and
 - j) where appropriate, cooling, molding, pelletizing and/or further processing of the fiber-reinforced strand provided with a sheath composed of the second thermoplastic molding composition.

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2. The process as claimed in claim 1, wherein a plurality of opened multifilament strands, preferably from one to a hundred, are introduced into the first impregnator.
- 5 3. The process as claimed in claim 1, wherein the fiber-reinforced strand provided with a sheath composed of the second thermoplastic molding composition is cooled, molded, chopped into pellets, and/or further processed after leaving the second die.
- 10 4. The process as claimed in claim 1, wherein the first thermoplastic molding composition is substantially composed of at least one thermoplastic polymer, of at least one catalyst, and, where appropriate, of at least one antioxidant, and wherein the proportion of the multifilaments is from 10 to 80% by weight, based on the weight of the fiber-reinforced rod leaving the first impregnator.
- 15 5. The process as claimed in claim 1, wherein the catalyst in the first molding composition is a catalyst which catalyzes transesterification, transamidation, or transurethanization reactions, or which catalyzes the formation of ester groups, amide groups, and urethane groups.
- 20 6. The process as claimed in claim 1, wherein the catalyst in the first molding composition is a Lewis acid.
- 25 7. The process as claimed in claim 1, wherein the catalyst in the first molding composition is selected from the group consisting of phosphonium salts, phosphanes, ammonium salts, sulfonium salts, titanates, titanyl compounds, zirconates, and mixtures of these.
- 30 8. The process as claimed in claim 1, wherein the additive in the second molding composition is selected from the group consisting of mineral fillers, colorants, antistatic agents, lubricants, tribological auxiliaries, antioxidants, UV stabilizers, acid scavengers, coupling agents, mold-release agents, nucleating agents, ultrahigh-molecular-weight polyethylene, impact modifiers, in particular elastomers, or their mixtures.

9. The process as claimed in claim 1, wherein, in the second molding composition, additives are used which are present in a separate phase in the polymer matrix.
- 5 10. The process as claimed in claim 1, wherein the thermoplastic polymer for the first molding composition and/or the second molding composition is selected from the group consisting of polyolefin, in particular polypropylene, polyethylene, or modified polyolefin; polyacrylate, polymethacrylate, and polymers obtainable by polymerizing esters and/or amides of acrylic acid or methacrylic acid, and also copolymers of these, polyamides, polyesters, polycarbonate, polyethers, polythioethers, polyacetals, polyphenylene oxides, polyarylene sulfides, and mixtures of these.
- 15 11. The process as claimed in claim 1, wherein the catalyst in the first molding composition is selected from the group consisting of ethyl-triphenylphosphonium bromide, tetraphenylphosphonium bromide, tetrabutylphosphonium bromide, stearyltributylphosphonium bromide, triphenylphosphane, n-butyl titanate, and mixtures of these.
- 20 12. A fiber-reinforced and thermoplastic-sheathed strand composed of a first fiber-reinforced thermoplastic molding composition which is sheathed with a second thermoplastic molding composition and which is obtainable by the process as claimed in claim 1, where the first thermoplastic molding composition is substantially composed of thermoplastic polymer, catalyst, where appropriate coupling agent, where appropriate antioxidants, and/or, where appropriate, UV stabilizers, and where the second thermoplastic molding composition comprises additives.
- 25 13. A fiber-reinforced molding obtainable by shaping the fiber-reinforced and thermoplastic-sheathed strand as claimed in claim 12 or by shaping of pellets produced by comminuting the fiber-reinforced and thermoplastic-sheathed strand as claimed in claim 12.
- 30 14. The use of the sheathed strands obtainable by the process as claimed in claim 1 for producing fiber-reinforced moldings for use as

components for vehicle applications, for household devices, or for sports equipment.